What is Claim d is:

1. A powder batch comprising glass particles, wherein said glass particles are substantially spherical, have a weight average particle size of not greater than about 5 μm and a surface area of at least about 3 m^2/g and wherein said glass particles comprise silane groups attached to the outer surface of said particles wherein the concentration of silane groups is at least about 5 silane groups per square nanometer of glass surface area.

2. A powder batch as recited in Claim 1, wherein at least about 80 weight percent of said glass particles have a size of not greater than about 2.5 times said average particle size.

3. A powder batch as recited in Claim 1, wherein at least about 90 weight percent of said glass particles have a size of not greater than about 2.5 times said average particle size.

4. A powder batch as recited in Claim 1, wherein said powder batch has a bimodal particle size distribution.

5. A powder batch as recited in Claim 1, wherein said powder batch has a bimodal particle size distribution wherein a first mode of particles has an average particle size of from about 0.5 to 1 μm.

6. A powder batch as recited in Claim 1, wherein said glass particles comprise at least about 95 weight percent glass.

7. A powder batch as recited in Claim 1, wherein said glass particles have a particle density of at least about 95 percent of the theoretical density.

8. A powder batch as recited in Claim 1, wherein said average particle size is from about 1 μm to about 5 μm.

9. A powder batch as recited in Claim 1, wherein not greater than about 1 weight percent of said glass particles are in the form of hard agglomerates.

10. A powder batch as recited in Claim 1, wherein said glass is an aluminosilicate glass.

11. A powder batch as recited in Claim 1, wherein said glass is an aluminosilicate glass further comprising fluorine.

12. A powder batch as recited in Claim 1, wherein said glass is selected from the group consisting of calcium aluminosilicate, strontium aluminosilicate and barium aluminosilicate.

13. A powder batch as recited in Claim 1, wherein said glass is a barium boroaluminosilicate glass.

14. A powder batch as recited in Claim 1, wherein said glass particles comprise no greater than about 0.1 atomic percent impurities.

15. A powder batch as recited in Claim 1, wherein said glass particles comprise not greater than about 100 ppm metallic impurities.

16. A powder batch as recited in Claim 1, wherein said glass is an aluminosilicate glass and wherein the concentration of silica is higher near the particle surface than in the bulk of the particle.

17. A powder batch as recited in Claim 1, wherein said glass particles have a surface area of at least about 5 m^2/g.

18. A powder batch as recited in Claim 1, wherein said glass particles have a surface area of at least about 10 m^2/g.

19. A powder batch as recited in Claim 1, wherein the concentration of silane groups on the particle surface is not greater than about 3 weight percent silane based on the weight of the glass particles.

20. A powder batch as recited in Claim 1, wherein the concentration of silane groups on the particle surface is not greater than about 2 weight percent silane based on the weight of the glass particles.

21. A powder batch as recited in Claim 1, wherein said concentration of silane groups is at least about 7 silane groups per square nanometer.

22. A powder batch as recited in Claim 1, wherein said concentration of silane groups is from about 10 to about 13 silane groups per square nanometer.

23. A powder batch as recited in Claim 1, wherein said silane groups are methacryl-functional silane groups.

24. A powder batch as recited in Claim 1, wherein said particles have a refractive index of from about 1.40 to about 1.60.

25. A powder batch as recited in Claim 1, wherein said particles have a refractive index of from about 1.50 to 1.55.

26. A powder batch of dental glass particles wherein said glass is a barium boroaluminosilicate glass and wherein said particles are substantially spherical, have an average particle size of from about 1 μm to about 5 μm, a particle size distribution wherein at least about 80 weight percent of said glass particles have a size of not greater than about 2.5 times said average particle size and wherein the surface area of said glass particles is at least about 3 m^2/g.

27. A powder batch as recited in Claim 26, wherein said glass has a composition comprising from about 55 to 65 weight percent SiO_2, from about 28 to 38 weight percent BaO, up to 10 weight percent B_2O_3 and up to 4 weight percent Al_2O_3.

28. A powder batch as recited in Claim 26, wherein said particles have a density of at least about 95 percent of the theoretical density for said glass composition.

29. A powder batch as recited in Claim 26, wherein said glass particles have a refractive index of from about 1.40 to about 1.60.

30. A powder batch as recited in Claim 26, wherein said glass particles have a refractive index of from about 1.50 to 1.55.

31. A powder batch as recited in Claim 26, wherein the concentration of silica is higher near the particle surface than in the bulk of the particle.

32. A powder batch as recited in Claim 26, wherein said glass particles comprise silane groups attached to the outer surface of said particles.

33. A powder batch as recited in Claim 26, wherein said glass particles comprise silane groups attached to the outer surface of said particles wherein the concentration of said silane groups is at least about 7 silane groups per square nanometer of glass surface area.

34. A powder batch as recited in Claim 26, wherein said surface area is at least about 5 m^2/g.

35. A powder batch as recited in Claim 26, wherein said surface area is at least about 10 m^2/g.

36. A powder batch as recited in Claim 26, wherein said glass further comprises fluorine.

37. A method for the production of dental glass particles, comprising the steps of:

a) generating an aerosol of droplets from a liquid wherein said liquid comprises a precursor to barium oxide, boron oxide, alumina and silica;

b) moving said droplets in a carrier gas;

c) pyrolyzing said droplets at a reaction temperature of from about 1000°C to 1500°C and for a residence time sufficient to remove liquid therefrom and convert said precursor to barium boroaluminosilicate glass particles having a refractive index from about 1.40 to about 1.60; and

d) treating said glass particles to increase the surface area of said particles.

38. A method as recited in Claim 37, wherein said step of generating an aerosol comprises the step of ultrasonically atomizing said liquid.

39. A method as recited in Claim 37, wherein said carrier gas comprises air.

40. A method as recited in Claim 37, wherein said reaction temperature is from about 1000°C to about 1300°C.

41. A method as recited in Claim 37, wherein said reaction temperature is from about 1150°C to about 1250°C.

42. A method as recited in Claim 37, wherein said glass particles comprise not greater than about 0.1 atomic percent impurities.

43. A method as recited in Claim 37, wherein said glass particles have a particle density of at least about 95 percent of the theoretical density.

44. A method as recited in Claim 37, wherein said droplets in said aerosol have a size distribution such that no greater than about 30 weight percent of the droplets in said aerosol are larger than about twice the weight average droplet size.

45. A method as recited in Claim 37, wherein said barium oxide precursor comprises barium nitrate.

46. A method as recited in Claim 37, wherein said alumina precursor comprises aluminum nitrate.

47. A method as recited in Claim 37, wherein said boron oxide precursor comprises boric acid.

48. A method as recited in Claim 37, wherein said silica precursor comprises particulate silica.

49. A method as recited in Claim 37, wherein said method further comprises the step of annealing said glass particles.

50. A method as recited in Claim 37, wherein said method further comprises the step of coating said glass particles.

51. A method as recited in Claim 37, wherein said treating step comprises the step of contacting said glass particles with a basic solution or an acidic solution.

52. A method as recited in Claim 37, wherein said treating step comprises the step of contacting said glass particles with a basic solution or an acidic solution for a time sufficient to increase the surface area by at least about 100 percent.

53. A method as recited in Claim 37, further comprising the step of silanating said glass particles.

54. A method as recited in Claim 37, further comprising the steps of:

(e) contacting said glass particles with an aqueous environment to form hydroxyl groups on the surface of said glass particles; and

(f) silanating the surface of said glass particles.

55. A method for the production of dental glass particles, comprising the steps of:

(a) providing a batch of spherical glass particles having an average size of not greater than about 5 μm;

(b) treating the surface of said glass particles to increase the surface area of the glass particles by at least about 100 percent without substantially altering the bulk morphology of said particles;

(e) hydrolyzing the surface of said glass particles; and

(f) silanating the surface of said glass particles.

56. A method as recited in Claim 55, wherein said glass is an aluminosilicate glass.

57. A method as recited in Claim 55, wherein said treating step comprises contacting said glass particles with a basic solution or an acidic solution.

58. A method as recited in Claim 55, wherein said hydrolyzing step comprises contacting said glass particles with an aqueous environment for a time sufficient to form at least about 7 hydroxyl groups per square nanometer of glass surface area.

59. A dental resin composition comprising a resin polymer and spherical glass particles dispersed throughout said resin, wherein said glass particles have a surface area of at least about 5 m^2/g and wherein said glass particles comprise silane groups attached to an outer surface of said particles wherein the concentration of silane groups is at least about 7 silane groups per square nanometer of glass surface area.

60. A dental resin composition as recited in Claim 59, wherein the concentration of said glass particles in said composition is at least about 60 weight percent.

61. A dental resin composition as recited in Claim 59, wherein the concentration of said glass particles in said composition is at least about 70 weight percent.

62. A dental resin composition as recited in Claim 59, wherein said concentration of silane groups is at least about 10 silane groups per square nanometer of glass surface area.

63. A dental resin composition as recited in Claim 59, wherein said surface area is at least about 10 m^2/g.

64. A dental resin composition as recited in Claim 59, wherein said resin comprises vinyl group resins.

65. A dental resin composition as recited in Claim 59, wherein said silane group comprises a methacryl-functional silane.